

etched precision surface containing etching residue, with a composition which comprises liquid or supercritical carbon dioxide and a fluoride-generating species until the etching residue is removed from the precision surface.

REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

Before addressing the specific grounds of rejection raised in the present Office Action, applicants have amended Claim 1 to positively recite that the claimed process removes *etching residue from the surface of a previously etched precision surface*. Support for this amendment to Claim 1 is found throughout the specification of the instant application. See, for example, Page 2, lines 25-26; Page 4, lines 1-4; and Page 6, lines 7-12 of the specification of the instant application.

Since the above amendment to the Claim 1 does not introduce any new matter into the specification, entry thereof is respectfully requested. Pursuant to 37 C.F.R. §1.121, applicants have attached a marked-up copy of Claim 1 which shows the changes made by the current amendment. The attachment is captioned as **“VERSION WITH MARKINGS TO SHOW CHANGES MADE”**.

Claims 1, 2, 15 and 16 stand rejected under 35 U.S.C. §102(e) as allegedly anticipated by U.S. Patent No. 6,331,487 to Koch (“Koch”). Claims 3-14 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over the combined disclosures of Koch and the article to R. Alm entitled “Formulation Techniques Using Triflic Acid Salts”

("Alm"). Claims 17-20 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over the combined disclosures of Koch and U.S. Patent No. 6,316,057 to Hirayama, et al.

("Hirayama, et al.").

Turning to the §102(e) rejection, it is axiomatic that anticipation under §102 requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants respectfully submit that the claims of the present application are not anticipated by the disclosure of Koch since the applied reference does not disclose applicants' claimed process which removes *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*. Instead, Koch provides a process for removing chemical mechanical polishing (CMP) residue from a previously polished surface layer. The CMP residue disclosed in Koch contains CMP chemicals (such as a silica-based or metallic based slurry material) and particles (from the polished surface) that are formed following the CMP process. In the claimed process, etching residue is removed from a precision surface. The etching residue that is removed by the present process is composed of etchant gas material, the material being etched as well as the polymeric photoresist material which is used in forming the vias, cavities, trenches or channels. Applicants respectfully

submit that the etched residue removed by the claimed process is different from CMP residue that is removed in the process disclosed in Koch.

Applicants further submit that in the present claimed process the etching residue is removed from a precision surface that contains vias, cavities, trenches and channels therein. In contrast thereto, the CMP residue is removed from a surface which has been planarized by a CMP process. As is well known to those skilled in the art, the CMP process is not used in forming precision surfaces that have vias, cavities, trenches, and channels. Instead, the CMP process provides a planarized surface.

The foregoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention, as required by King and Kloster Speedsteel; therefore the claims of the present application are not anticipated by the disclosure of Koch. Applicants respectfully submit that the instant §102 rejection has been obviated and withdrawal thereof is respectfully requested.

With respect to the various §103 rejections, applicants submit that the claims of the present invention are not rendered unpatentable by the disclosures of Koch in combination with Alm; or Koch in combination with Hirayama, et al. since none of the applied references teaches or suggests applicants' claimed process for removing etching residue from a precision surface having vias, cavities, trenches and channels formed therein.

Koch is defective since the applied reference does not teach or suggest a process for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*. Instead, Koch provides a process for removing chemical mechanical polishing (CMP) residue from a previously polished surface layer. Applicants respectfully submit that the remarks made above in regard to the anticipation rejection apply

equally well here for the obviousness rejections; therefore the above remarks are incorporated herein by reference.

Alm does not alleviate the above deficiencies in Koch since the applied secondary reference also does not teach or suggest a process for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*. Instead, Alm discloses the use of acid catalysts based on trifluoromethanesulfonic (triflic) acid that, when heated, catalyze the polymerization of cationically sensitive thermoset resin coatings. Applicants respectfully submit that the disclosure of Alm does not teach or suggest that triflic acid or one of its salts can be used in conjunction with liquid or supercritical fluid carbon dioxide to remove *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*.

In view of the above remarks, applicants respectfully submit that the combined disclosures of Koch and Alm do not render applicants' claimed process for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein* obvious.

Hirayama, et al. do not alleviate the deficiencies in Koch since the applied secondary reference also does not teach or suggest a process for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*. Instead, Hirayama, et al. disclose a process for coating a surface of a semiconductor device which comprises the steps of applying a reagent comprising a reactive group selected from Si-H, Sn-H and Ge-H, in the presence of a platinum metal onto a surface that is to be coated. Applicants respectfully submit that the disclosure of Hirayama, et al. does not teach or suggest that the reagent disclosed therein can be used in conjunction with liquid or

supercritical fluid carbon dioxide to remove *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*.

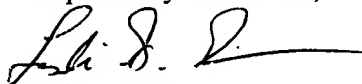
In view of the above remarks, applicants respectfully submit that the combined disclosures of Koch and Hirayama, et al. do not render applicants' claimed process for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein* obvious.

The various §103 rejections also fail because there is no motivation in the applied references which suggest modifying the disclosed processes such that the same can be used for removing *etching residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein*. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A process of cleaning a precision surface comprising contacting an etched precision surface having vias, cavities, trenches or channels incorporated therein, said etched precision surface containing etching residue, with a composition which comprises liquid or supercritical carbon dioxide and a fluoride-generating species until the etching residue is removed from the precision surface.